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Thesis on Epilepsy

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Summary

A thesis on epilepsy built on a fifteen years experience of its treatment in private practice and a four years knowledge of it at an epileptic colony and school for boys. to shew

1st reason why it should be regarded as a symptomatic condition and but the cerebral response to over sensory stimulation of the brain

2nd that this is borne out by the experiments of Bechterew, the complex nature of the disease and numerous clinical cases

3 that this cerebral response is elicited from a perfectly healthy brain, a defective brain or a diseased brain

4 that such response oft repeated wrecks the brain

5 that being in its early stage a cerebral reflex, in its fuller stage a cerebral vice, bromides are the remedy

6 that bromide of potassium can be given in doses of 80 grains a day or more, for years with decided advantage to the moral, mental & physical welfare as evidenced by the educational report of boys so treated and with curative effect on the epilepsy

7 that the terms 'organic' & 'idiopathic' are misleading unscientific and unjustified and

8 that. Heredity influence has been much over stated

EPILEPSY. What is the meaning this word conveys to the medical mind? What picture have we of the patient so affected? It may be an individual who has a lapse of memory for a minute or a momentary phase of unconsciousness or he may be so unfortunate as to have gross bodily convulsions for days with loss of consciousness for even a longer time than his convulsions. The epileptic then may be, just not himself, odd in speech or behaviour now and again, or he may be a hopeless, helpless, pitiable invalid for life. It is evident we are dealing with a very variable disease. Its name we got from Hippocrates and meaning "a seizure" it is still singularly applicable to the malady for it certainly is a seizure. The name epilepsy is of Greek origin, but the Romans had no less than nineteen names for it, and in coming down to us they are a testimony of how our forefathers regarded the disease. Some of the names are religious, some are superstitious, some sentimental but all more or less expressive of some outstanding feature of the disease

Morbus sacer: the sacred disease.

Morbus commitialis: the commital disease. When it occurred in assembly - it committed the assembly to attend to it first - it had the right of way

over all other business.

Morbus Sideratus: the star-struck disease - this displays the belief that the afflicted was struck down by a star.

Morbus Caducus: the falling disease.

Morbus insputalis: the frothing or spitting disease.

Morbus Viridellus - Mensalis - Convivialis - Demoniacus etc., meaning the green - the table - the feast or the demon disease.

Epilepsy is to be seen in the characters of the Bible. In the gospel of Matthew, a father bewails the condition of his son whom he describes as "a lunatic, often falling into the fire and the water, and is sore vexed." In Mark one reads of one "denouncing our Lord to his face and straightway being torn by a spirit.

The association of the disease with hysteria is neatly alluded to in Woman's Universe, 1652, where doctors

Could never cure her falling ill
Which takes her when she pleases.

Germans call the disease Fallsucht, but our English "fit" or falling sickness expresses the condition as neatly and briefly as any name could.

Coming to our own time and our own authorities we

find ourselves still in as much doubt and uncertainty as our forefathers did. We do not yet agree as to what the nature of the disease is, its site and cause disputed and its treatment is as vague as ever. It is most interesting to note what the expressed opinion of our authors and teachers is:

Bristowe: It is a functional disorder of the nervous system.

Russell Reynolds: A chronic disease of which the characteristic symptom is a sudden trouble of loss of consciousness, this change being occasional and temporary, sometimes unattended by any evident muscular contraction, sometimes accompanied by partial spasm and sometimes by general convulsions.

Echeverra: It is a disease constituted by chronic paroxysms, excited upon a direct reflex action on the medulla oblongata in a condition of exalted irritability coincident with sudden depression of the cerebral circulation and with loss of consciousness with or without muscular spasm.

Albutt: Recurred attacks, sudden and very brief, of disturbance of some of the cerebral functions acting on consciousness which are not due to any cause outside the brain.

Osler: An affection of the nervous system.

Taylor. It is a disease in which there are attakks of loss of consciousness with or without convulsions, independent so far as our present knowledge goes, of demonstrable lesions of the brain, of peripheral irritation or blood poisoning ------- It is then a functional disorder of the brain.

Sir T. R Fraser: A group of nervous aberrations produced by various lesions.

Sir T. Granger Stewart: A chronic disease of the nervous system caused by peripheral irritation, cachectic conditions and morbid states of the nervous system not ascertained.

Sir W. R. Gowers: A recurrence of sudden brief disturbance of some function of the brain varying in degree, but generally attended by an arrest of consciousness sufficient at least to interrupt the control of the muscles necessary for the maintenance of the erect posture.

The important thing to note about all these opinions is that while they all agree very much on what the symptoms of the disease are, there is little agreement about anything else; some of the opinions are even contradictory. Allbutt would have nothing epilepsy that had its origin outside the brain. Granger Stewart recognised peripheral irritation and

morbid states as a part of epilepsy. Osler is too discreet to say anything: No exception can be taken to the terse definition given by Fraser to his clinical class in 89. Taylor says and unsays until he has nothing but function left. Echeverra lays stress on refrex action and an exalted medulla; whereas a close study of Gower's book leads me to understand that he believes the cause to be "an abnormal state of chemical nutrition whereby the molecules are more readily detached and yield their atoms with undue facility to the attraction of the adjacent oxygen - and that this release may be effected by a stimulus too slight to be perceived." Even Gowers then grants the probability of a stimulus in the causation of epilepsy.

Since the beginning of 1903 I have held the post of visiting physician to Starnthwaite Epileptic School and Colony, and during that time have seen much of the disease in boys. Throughout this thesis I am mainly writing of the disease as it is seen in boys and entirely of it as it appears to my own observation unfettered by any preconceived ideas as to its nature and treatment. Two incidents in this connection I ought to mention. 1st.- As a student of Sir T. R. Fraser's class I well remember his lecture on bromides. Speaking of potassium bromide he said "that its action

was one chiefly if not solely of allaying reflex action , and that it could be given safely in large doses. The dose was 20 to 40 grains, but 40, 60 or 80 grains was a moderate dose. It could be given in doses of 100 or 120 grains a day, even larger doses had been given, 200 grains,in fact 300 or 400 grains had been given." So I have it in my notes. The statement surprised and impressed me very much. 2nd.- While in charge of a practice in Newcastle-on-Tyne I was urgently called to see a woman in a fit. It was over before I got there and she was semi-conscious. I learned that she was an epileptic of six years standing. The following day she told me that she always had a blood-stained discharge from her ear after a fit. I examined the canal and found it was very tender, had an ulcerated look and something black sticking in it. This was found to be a spicule of wool - it was removed and the epilepsy ceased. The lesson I learned from this was that at least some cases of epilepsy were due to reflex nerve ~~s~~ disturbance and that the chances were Fraser's doses of bromide would stop the disease. Since then I have had ample opportunity of putting this to the test, with results that are decidedly encouraging. Further on I submit tables showing the administration of bromide in large

dose arresting the epilepsy and improving the mental capacity for work as evidenced by the progress the boys make in their education, but in the meantime to support my belief that most cases of early pure epilepsy are due to censory peripheral causes I must ~~m~~ needs consider the

Nature of Epilepsy. All agree that the symptoms of an average case of epilepsy must be the result of a disturbance of the nervous system. Most agree that this disturbance is in the brain. Some maintain that it has its origin in the medulla,while others hold it to be in the cortex; but Gowers, so far as I can understand him, definitely says that the symptoms are due to a disease (page 6) of the cerebral cortex, and his reasons for this statement are

1. That the phenomena of an epileptic seizure are so obviously a display of the functions of the cerebral cortex that the disease must be in that structure.

2. The trifling nature of the exciting cause.

3. Its frequent occurence in those predisposed to nervous disease and insanity.

4. The experimental evidence of Bechterew.

5. The case reported by Debeke and a similar one observed by himself.

I wish to consider these reasons in the order given.

1. It does not necessarily follow that because the symptoms are those of cerebral cortex function the disease must be in the cortex. One might as well say that the symptoms of sea sickness are so obviously a display of the functions of the liver and stomach that the disease must lie in these organs,or that diabetes is so obviously a display of kidney function the disease must be there; so with every case of jaundice the disease must be in the liver. All that one can assume from the symptoms of epilepsy is that for their production the functions of the cerebral cortex are brought into play, but the cortex need not necessarily be diseased.

2. The trifling nature of the exciting cause. Is it trifling? That teething in children is in some cases a very painful process I have not the slightest doubt, and this too when the child is otherwise perfedly healthy, not suffering from latent rickets, inflammation of gums or gastritis. The very evident immediate relief that lancing of the gums brings about is enough to dispel all doubt on this point. I take it that the pain of teething is very much like the pain of toothache and none of us would admit that this is a

trifling matter. Ovarian pain may be trifling but I know where it was sufficiently severe and prolonged to cause suicide in one who was a member of a very healthy non-neurotic family. Severe fright is certainly no trifling matter at any time, but in childhood and youth in is most serious - e.g. A healthy child was playing on the hearthrug when the father suddenly and violently sneezed. This so frightened the child that it died within a few minutes. Few physicians will agree that chronic constipation and absorption of the products of bowel putrefaction is of trifling moment.

3. Its frequent occurrence in those who are disposed to nervous disease and insanity. This is the so-called predisposition. This is heredity. Because insanity is the hereditary and epilepsy is so often found with dements and the insane. It also must be hereditary, as insanity is due to disease or defect of brain so also must epilepsy be. The fallacy of the argument is obvious enough. The hereditary influence of epilepsy has been very much exaggerated. It is given at over 56% by Spratling. Gowers makes it out to be 45%; Echeverra at 25%; and Reynolds 31%. Of my 87 cases hereditary influence only appears in 17.1% and this includes similar and dissimilar heredity, brain tumour and suicide. Osler does not

find that epilepsy is markedly hereditary, in fact he expresses surprise that he found it so often absent. Marie, the Frence physician, also questions the hereditary nature of epilepsy. Aldren Turner considers the disease hereditary to over 50%, and adds that although it was not found in the other 50% it does not maan that it was not present as many displayed the stigmata of degeneration. On reading this one wonders how far this argument is to be carried, but granting that it is hereditary to 50% or over it is a very weak reason to submit in favour of epilepsy being a brain disease or even a functional disorder of brain.

4. The experimental evidence of Bechterew. Bechterew and his pupils exposed the cerebral cortex and applied electrical stimulation to it. They found that they could produce a tonic followed by chronic convulsioni and coma just like epilepsy, provided their stimulus was of a given strength and duration and applied over certain areas of cortex, and that if the cortex was removed and the stimulus applied to the white matter then only tonic convulsions followed. In consequence of this it is stated that epilepsy must have its seat in the cortex. My reasoning is notable to admit this. We have in this experiment

two factors - healthy brain and stimulation. These two produce artificial epilepsy - and here there is no need of heredity, no need of rickets, no need of abnormal chemical nutrition with detaching molecules and yielding atoms - only healthy brain and stimulation. In this experiment I believe we have the explanation of epilepsy as it presents itself in every-day practice - a healthy brain suddenly producing general convulsions and arresting consciousness when exposed to more sensory stimulation than it can stand. The sensory stimulation is likely of a varied character - pain and tension, toxins, fevers, injury, shock, strong emotions worry and fright. These sensory stimuli would in my opinion act in the same way as Bechterew electrical stimulation and act thus on a healthy brain.

5. The case reported by Oebeke. It is the case of a boy who had been epileptic from birth. In adult life he contracted a hemiplegia and in his subsequent fits the convulsions were limited to the sound side, the paralysed side remaining unconvulsed. The reasoning is that in this instance the epilepsy came from the cortex on each side, but the paths of conduction being blocked by the hemiplegia on one side the convulsions were unilateral. Had the epilepsy been due to conditions situated elsewhere than in the cortex

the convulsions would have been bilateral as before. Gowers observed a similar case. Against this I wish to place the case of A. J. M. in my own case. At age 32 he contracted a hemiplegia on right side, and within a year this was followed by epilepsy. In his fits which were "grand mal" type the paralysed side was as nimble as the left. His paralysis was complete in the arm, his leg recovered to walking powers though stiff, lame and stilted, yet there was no sign of paralysis when the fit was on. A birth palsy epileptic at the Colony exhibited the same condition. I do not attempt to explain how this comes about, but I submit them as evidence against Oebeke's case, proving the lesion of epilepsy being situated in the cerebral cortex. If epilepsy is due to a lesion in the cerebral cortex how does it come about that such lesion has not been demonstrated beyond question long ago? The disease is one that has been with us from ancient times, it is very prevalent, it has afforded, it is affording, the very fullest and best opportunity of exhibiting its pathology in the most perfect stage of development. The best pathologists of the past and present day have looked for this lesion in vain ~~yet~~ nothing convincing has been found, no single unvarying lesion present, and such abnormal and varying

conditions that have been from time to time discovered are admitted to be present in other diseases and pass by common consent as being more likely the result than the cause of epilepsy. Pigmentation and vacuolation of cells, changes in the perivascular spaces, patchy increase of the neuroglia, general neurogliosis, induration of the pes hippocampi have ceased to be considered the cause or causes of epilepsy, and although Spratling of Craig Colony lays some stress on the degeneration of the cells of the second cortical layer he does not seem to be convinced about it. This finding is the work of Clark and Prout, and has not been verified. Turner specially investigated this point and was only able to observe the disappearance of nuclear network, a condition not at all peculiar to epilepsy and the vacuolation of the nuclei of the second layer upon which Bevan Lewis lays so much importance is found in pneumonia and tubercle. Turner regards the immediate cause of epilepsy to be due to "a defectively developed nervous system as indicated by certain structural peculiarities in persons who have a special tendency to intra-vascular clothing; that prior to a fit a cortical stasis is produced by this clotting and that this clotting accounts for both the atrophy and sclerosis and the blood tumors so frequently

found in the brain of epileptics%" The assumptions here are great and are not born out of his evidence. The "structural peculiarities" are proved to be present to his way of thinking because he finds them in imbeciles that are epileptic. He states that evidences of intravascular clothing are abundant and gives a micro-photograph shewing them, but he does not trace their history. What becomes of them, the conditions they give rise to, or their ultimate effect on the brain structure? If they were the immediate cause of the convulsions as suggested, their presence in those cases that exhibited 400 or 500 fits a year would surely soon make itself known by very obvious signs. How would special tendency to intra-vascular clothing be accounted for where, as frequently happens, only one member of a large healthy family develops epilepsy? At page 184 of his book Turner states two factors are necessary for a fit, "(a) A brain hereditarily and structurally predisposed to instability and convulsion; (b) A sudden deprivation of the normal blood supply." I do not think that (a) exists in at least 60% of epil-eptics, and (b) is a conjecture only and an unlikely one.

Evidence in favour of ideopathic epilepsy being in its early manifestation mainly due to peripheral

sensory disturbance.

1st. The experiments of Bechterew, already referred to in this thesis at page 10, where it is shewn a healthy brain yielded an epileptic state on sensory stimulation.

2nd. The absence in the brain of any lesion sufficient to account for the condition even in advanced cases of the disease (also discussed page 12).

3rd. The following clinical cases observed by myself, and

4th. Cases reported by others.

Cases observed by myself:

(a). W. S., female, age 21. At the age of 16 she suffered from atrophic rhinitis, with foul discharge and at times great pain. She could stand the pain for a few hours, but if it kept on for a whole day or night she was sure to have a genuine epileptic fit. This went on for three and a half years, average number of fits two a month. The rhinitis was obstinate of traatment, but 18 months ago improvement set in, discharge got less, pain went with it, the result that there has been no further epilepsy. She is a member of a family of fourteen - all very healthy - grandmother alive and working at 90. Therefore an example of sensory stimulation of the brain giving rise to epilepsy.

(b). Case of metritis and retroversion. Fifteen years ago a woman age 42 came to me with the above complaint. She was healthy and had good family history. On introducing uterine sound to turn the organ forwards she had an epileptic fit, and this was repeated when I repeated the same procedure the following week and again the fortnight after. The fit occurred just when I was turning the fundus forwards, probably the minute I pulled upon the ovaries - sensory stimulation producing a fit.

(c). A child three months old was very cross and cried much for a day or two, was extremely restless, slept little and kept pulling at its gums. I was sent for late at night "to lance the gums," but considering the age of the child and the absence of all sign of inflammation or teeth I declined to use the lance. During the night the child had severe convulsions, and the next morning in a better light I could see two teeth peeping through a bed of inflammation. This child had no rickets and no fault in the alimentary canal. It was a healthy child of a healthy family. The after history is noteworthy. When eighteen months old another attack of convulsions happened, clearly due to overfeeding by an indulgent sister. About this time the parents

left my district and during the following three years it had several attacks of convulsions. At the age of six there was a very severe attack, and a doctor who was called in said it was the beginning of scarlet fever. The mother said it was school excitement. Scarlet fever did not develop, but six weeks after there was another attack of convulsions and the doctor promptly pronounced it epilepsy. To the parents this was an unexpected confirmition of what I had told them years before and what they had declined to accept. The child was brought back to me for treatment, was given 80 grains of bromide a day for a year, 60 grains per day for a year more, 40 grains per day for the next six months. At present she takes 20 grains at bedtime. During this treatment of two years and nine months there have been no fits, no rash, no depression. She is quite a smart school-girl with a tendency rather towards undue excitement rather than depression.

That teething is in some cases accompanied with great pain I have no doubt. Probably in most cases the pain is not so intense as it is constant and nagging, continuing for weeks, causing loss of appetite, loss of sleep, restlessness and a state of high nervous tension which frequently culminates in convulsions, I have watched these over and over again. There is a sudden onset, loss of con-

sciousness, a short tonic with prolonged, often half-hearted lingering clonic stage - a dawn of consciousness to be followed by more tonic and clonic spasms - then a further period of consciousness merging into sleep and recovery. Infantile of teething epilepsy would be a much better name for this condition. I have been able to trace the teething history in 34 cases, and 15 of these had infantile convulsions stated to be due to teething. I have been able to get the teething age in 30 cases, and the average is 8·6 months. This is important, as Gowers over and over again states that it is delayed dentition and rickets that act as the cause of the convulsions in infancy and not teething. There is no close association between convulsions and delayed dentition. One case dentition is delayed until 18 months and there are no convulsions. One gets teeth at third month with convulsions. One at sixth month with and another at the same month without convulsions. If we come to the question from the side of rickets then we find the association between the two less marked. Out of 117 children with evident rickets I found only 7 that had teething convulsions; and McIlraith finds the percentage to be 10.% It is reasonable to say that out of the vast numbers of rickety children only a small

percentage of them become epileptic. In 34 epilepsy cases where I was able to get a history of its teething I found 15 had convulsions at that time or 44·1 per cent. What is of much more importance is how many cases of infantile convulsions become epileptic. My experience makes me think that a very large percentage of them do become epileptic, but the lay mind does not associate the two and parents forget all about infantile convulsions (they are so common, they say), that unless special inquiry is made no history is given. Keeling gives the percentage at 43·3 out of 150 cases; Moon found it to stand at 40%. I feel that this is much below the mark and I am convinced that it would be well for the patient if such cases in healthy children were treated as epilepsy and the disease checked.

(d). Fright is often a cause of epilepsy, I venture to say idiopathic epilepsy. A healthy, strong boy of 11 years was going down to the cellar for coal. He had to pass a window, and there he saw "a pale face with starving eyes." It was his father, but the fright made the boy quite ill, and he had an epileptic fit that week, and continued them at the rate of 45 a year. At the colony under treatment they disappeared in six months. He has been free from fits

for three years, and is now earning a decent livelihood at farm work. No heredity in this case. It is difficult to conceive how Gowers - artered state of chemical nutrition with detaching molecules and yielding atories - explains this. Cause - sensory stimulation. Result - epilepsy

(e). Excitement. A boy aged 5 got trousers on for the first time. He was very proud of them. When his father came home at night there was much excitement. The boy would jump and strut to shew how well he looked in his new garb. The father clapped his hand in appreciation, and the son further elated ran round the table in glee but fell down in an epileptic fit and continued to have genuine epileptic fits for ten years. He was treated with bromide and has now been free from fits and bromide for four years. He is a railway clerk. No heredity, another example of sensory stimulation and fit.

(f). Alcohol. Publican age 28, free from liver and kidney disease, family history good. He indulged in periodic drinking bouts with long intervals of sobriety. He drank hard for a fortnight, he could not go on longer on account of gastritis and sleeplessness. His breath got foul and frequently about 7 or 10 days after he stopped drinking he had

epilepsy, due doubtless to alcohol and toxins stimulating the brain. I once attended this man for D. T.'s but his fits were epilepsy, and his wife told me he sometimes had them apart from drinking.

(g). Constipation. Mrs. W., age 35, consulted me about her epilepsy. She had about two fits a month. She had very pronounced constipation, bowels only moved once in ten days unless she took laxatives daily, and this she felt she could not do. Treatment Cascara and bromide for three months; subsequently cascara alone. Result - no more epilepsy.

(h). Eclampsia Puerperal. I regard as a passing epilepsy of pregnancy. I have had two cases and observed the fits closely. They differ from epilepsy in having

1st A more conscious dread of the coming fit,

2nd The tonic convulsion lasting longer and being established before consciousness was lost;

3rd The clonic convulsions soon over and quickly followed by a

4th Semi-conscious state in which the surroundings were recognised but all appeared "so big - so big." The relatives and doctor were "double size."

Chloroform was given and the seven months' pregnancy brought to an end at 8 a.m. By mid-day she

was well, but had little recollection of what had taken place.

The second case presented the same outstanding features, but labour had set in before I got there and unconsciousness was more lasting, so much so that instruments could be applied without chloroform, and a healthy child delivered. In this case ~~also~~ the semi-unconscious stage lasted for fourteen days after delivery. In both cases there was albuminuria. I submit these two cases as examples of a peripheral disturbance giving rise to an epileptic condition and quickly getting well when that peripheral disturbance is removed. Féré - Eclompsia is acute epilepsy.

Cases reported by others:

1st. Gowers states that worms are the cause of infantile convulsions, and (page 13 of his book) further states that in rare cases attacks set up in this way continue after the cause has been expelled.

2nd. Osler reports that of a man with an undescended testis who suffered from epilepsy, pressure on the testis produced an attack. Its removal cured the disease.

3rd. Work Dodd (Brain 1893 - page 534). Errors of refraction treated in 52 epileptics, 36 improved and 13 arrested temporarily.

4th. G. M. Gould gives six cases of epilepsy due to eye strain and cured by glasses (Annals of Opthalmology - Oct. 05, and American Med. Vol. IV, No. 1, page 21 - 5/7/02).

5th. Grainger Stewart. Case of "Bridget," whom he shewed to his students for many years as an interesting case. She suffered from right lateral hemianopsia, and when the light was shut gradually off the left half of each retina she had convulsions. What I remember of the case is this. Bridget, a washerwoman, age 52, was brought into the theatre and made to look straight ahead of her with her left side to the students. The professor then took a student's notebook and holding it to her left side about two feet in front of her face he gradually brought it between her and the light. The minute it intercepted the light from the window falling on the left side of each retina Bridget screamed and fell into the arms of two students who were told to catch her. She was convulsed, apparently unconscious, and in this condition was carried from the room. I was sitting in the back benches and could not say whether the convulsions were epilepsy or not. I have no recollection of being told that she was an epileptic as she was brought in at the end of a lecture. I mention

the case as a proof that may be known to my readers, of sensory stimulation of brain producing an epileptic state.

Organic Epilepsy. All agree that this form of epilepsy is symptomatic. It is simply that form of t the disease that is due to organic disease of the brain, such as tumor, abscess, hoemorrhage, thrombus, embolism, and the birth palsies. We hear less of predisposition in this type. In the case of tumor or abscess the epilepsy is produced by pressure, irritation, or stimulation of the otherwise healthy brain, just as the artificial epilepsy was produced by Bechterew's stimulation, and in the same way as the various sensory peripheral stimulation produced the disease. The lesion that produces birth palsies is often so slight and its repair so perfect that it can scarcely be detected post mortem, yet the convulsions such lesions give rise to frequently recur and continue establishing epilepsy. The lesion disappears, but the epilepsy continues - why? In the epilepsy caused by teething or worms (Gowers, page 31) we have an exact analogy. In each case the cause disappears but the disease remains, yet in the one case the epilepsy is called organic, in the other idiopathic. The explanation of the condition

is this - the lesion in each case acted like Bechterew's stimulation and caused a healthy brain to burst out in fury owing to its over-sensory stimulation, the pain and tension of teething acts in the same way, other lesions do the same, and the brain gets teased, less tolerant, almost vicious in its habits, so that it will reply long after the original lesion disappears, to other sensory disturbances with an epileptic fit. Epilepsy thus becomes a reflex act in its origin, but a cerebral vice in its fullen growth and perpetuation - the greater the vice the less the sensory stimulus is required to carry it on, and in time the functions and structure of the brain become wrecked.

Epilepsy is often present in imbeciles, idiots and the feble-minded, but here again I consider the disease symptomatic, and the result of the conditions that bring about the imbecility, etc. Instead of speaking of these cases as epileptic imbeciles, I should speak of them as imbeciles with epilepsy. Epilepsy is often present in the microcephalic and hydrocephalic, but no one suggests that it is the cause of these conditions. Epilepsy does produce imbecility but here the history is very different - this individual was at one time quite well and took his part at school and business with credit and distinction,

then epilepsy comes, runs riot with his mental powers and after it may be many years reduces them to imbecility. This is a very different state to the child that is born an imbecile and becomes an epileptic owing to its brain defect. A. F. Tredgold pointed out that in primary amentia 56% of the imbeciles were epileptic only in a secondary sense. I have also noticed cases where epilepsy was secondary to hysteria, and others where hysteria was secondary to epilepsy.

Epilepsy then being such a varied disease it becomes very necessary for purposes of treatment to have some working classification. I submit the following as practical:

Developmental Epilepsy - due to defect of brain or skull: micro- or hydro-caphalus imbecility amentia - palsies.

Neoplastic Epilepsy - due to tumor gumma tubercle, blood-clot thrombus, embolism.

Peripheral Epilepsy - due to pain and tension, teething, worms, ovarian and alimentary pain, inflammatory conditions.

Toxic Epilepsy. Lead, alcohol and fever poisoning, severe migraine renal insufficiency, bowel putrefaction.

Emotional Epilepsy. Fright, worry, passion,

excitement.

Traumatic Epilepsy. Injury and its results.

The advantage of a classification of this kind is that it gives the clue to proper treatment and leads to a better reasoning out of when and when not to treat an epileptic, for it becomes a doubtful procedure to push treatment aimed at arresting the convulsions when such convulsions are the product of imbecility. Little good comes of arresting the epilepsy if imbecility remains and the same might be said of amentia generally and of hydrocephalic cases. Developmental cases then are very often not suitable for treatment. Neoplastic epilepsy also presents many cases that one would hesitate to treat. Where the cause can not be removed and the arresting of the epilepsy leads to no betterment in the patient's well-being and not likely to, no good is derived from the treatment. Peripheral cases, on the other hand, if got before repeated fits have wrecked the brain are the very cases to treat radically and if necessary continuously, for in this class the arrest may be a permanent arrest or cure, or the arrest may only be attained by continuous treatment extending over many years. Even if treatment has to be continued for many years it is well worth doing, as it allows the individual to be self-supporting and a

responsible citizen, to say nothing of the great advantage of maintaining him-self. Toxic cases too are hopeful, and the name directs one to look round for lead, alcohol and bowel toxins, directing treatment to this as well as to the epilepsy which is but an expression of the real disease. Emotional cases constitute in the young, the most favourable type of the disease to treat. If such cases are removed from homes to the peaceful repose of country life and a course of bromide they do very well.

Symptoms of Epilepsy are so well known and have been so fully expounded that it would serve no useful object to consider them in detail or anything like fully. All other aspects of the disease having so thoroughly baffled solving that observers have expended the full force of their acumen in dissecting and elucidating the symptoms. I wish to again draw attention to the diversity of the disease. The symptoms range from merely "sensations" to the status epilepticus, from moral obliquities to suicidat acts, and from momentary lapse of memory to weeks of unconsciousness. The conditions that are present after attacks of like severity also vary much. Some are better immediately and feel relieved, others are drowsy for weeks and feel worse; the intellect is

temporarily brighter in some, it is blunted in others, passions are soothed in some, roused to mania in others. The effect that a like number of similar fits have on the brain varies exceedingly:in some, the brain power s seems none the worse,in others it is totally wrecked. All this diversity of symptoms, subsequent conditions and effects suggest different causes, different underlying states, different forces at work. The aura is a part of the disease, and probably differs more than anything else. Gowers' work on the nature of the aura is an object lesson in clinical observation and a monument of industry and careful study. He was of opinion that through the aura one could get to the cerebral site and origin of the disease, but Leonard Hill by the compression of his own carotid produced (and described) what Gowers would have called a typical aura. Hill's description of his own feelings is Gowers' description of an aura. This leads me to consider the aura as simply the result of a vaso motor convulsion preceding the general convulsion. Vaso-motor spasm is present in every case, and in those cases where this spasm precedes the general convulsion it gives rise to the aura. This satisfactorily explains its nature, its presence and its absence, for in many cases the vaso-motor spasm is swallowed up in the general

convulsion and the aura not seen.

Treatment of Epilepsy. A very good rule in the treatment of every disease is to remove the cause, and in epilepsy treatment the very first point to deal with is the cause. It has a cause always, and often a removable one - worms, errors of refraction, the pain and tension of teething and other conditions, alcohol, lead, toxins of bowel putrefaction and fevers, constipation, uterine conditions, depressed fracure, gumma and tumors. If the cause can not be removed, then it ought to be rendered inoperative by bromide where such treatment restores the patient to health, usefulness, comfort or betterment. Often the original cause has passed away and then one is mainly dealing with a cerebral vice and ought to try and check it if the brain is not already wrecked by epilepsy.

Prophylactic Treatment. This is really very necessary in the neurotic child. Everything possible should be done at home and at school to secure a quiet, methodical, regular routine in everything, moderation in games and play and a judicious checking of anything that is likely to lead to outbursts of passion or excitement. Little defects of health should be seen to early, gastric catarrh treated, constipation avoided and teeting watched, headache

and eyestrain borne in mind.

Colony Treatment. For nearly all cases of epilepsy in childhood and youth colony treatment is almost essential for success. It is wellnigh impossible to get even intelligent parents to comprehend that treatment must be carried out so long after an apparent cure seems to have taken place, uninterrupted treating for years for a condition that is not obvious to their senses, they cannot understand; and it is only when fits recur repeatedly after each repeated interruption of treatment that they recognise the truth. Colony treatment alone for that group of cases that have their origin in fright, passion, excitement and emotional disturbances is occasionally curative. In this kind of case the child has been removed from the cause of the disease and the conditions which kept it going, viz. the noise, strife, bustle, dread, degenerate moral petting or rank outrage, and neglect of body and mind. When the child is removed from these disturbing surroundings the brain gets repose, tranquility of function is restored, inhibition is cultivated and that unfrequent result of spontaneous cure comes about. The colony provides a healthy country life, fresh air, regularity of meals, suitable diet, and quiet methodical routine in drill, discipline

and outdoor games. At our colony at Starnthwaite a very excellent elementary education is given by a recognised schoolmaster and assistant mistress, and many most unlikely boys get on very well. Another great advantage that colony treatment has, is that the stigma of being an epileptic is removed, for all are epileptic and that morbid desire for sympathy and notoriety so prejudicial to improvement is checked and a healthy rivalry to be first cured induced. In this quiet, healthy, well-regulated routine of work and play with skilled supervision, the epileptics have just that atmosphere which is most likely to help to establish a cure of maintain a betterment.

Bromide Treatment. I have endeavoured to show that epilepsy is far more frequently the direct result of reflex sensory stimulation of the brain than has hitherto been conceded , and in the curative action of bromide this reflex causation of epilepsy receives strong support. The effect of bromide is essentially one of blocking reflex action. This is the view that German authorities take of its action, but I think that it was Sir T. R. Fraser who first demonstrated it thus: An electrical stimulation of given strength was applied to the leg of a frog and muscular contractions of the whole body ensued. Under

bromide the same stimulus produces less contraction, and more bromide limited the contractions to one side of the body. An increased dose of bromide limited the muscular response to the same stimulus to the leg only, and it was possible to administer such a dose of bromide as would limit the muscular response to the same stimulus to the muscle or group of muscles stimulated. If epilepsy is, as I take it to be, the produlct of, or the response to over-sensory stimulation of the brain, then we ought to have in bromide a remedy for this disease, or at least a very effective weapon in combating it.

This is the principle on which I use bromide in treatment, and I administer that amount which is necessary to stop the convulsions, no matter what that amount is. The average dose required is eighty or ninety grains a day (see Clouston Journal of Mental Science, Oct. 1868), but one hundred and twenty, or one hundred and eighty is very frequently needed, and can be safely given for years so long as any fits are in evidence or signs of them present, as exhibited by fits of temper or frenzy. One can not poison by bromide while fits continue, or in other words there is no danger in the drug while convulsions are evident. When it takes large doses to stop the

fits the dose should be reduced whenever this is accomplished, and increased again should they reappear. I have a boy at the colony now who has been taking one hundred and sixty grains for two months (January and February, 1908) without fits. On the 19th of March he had two slight fits and the bromide was then increased to one hundred and eight grains per day. He has been free from fits since then but has two or three outbursts of temper, and unless they disappear the bromide will be further increased. With this dose he is in excellent health, doing useful work at market gardening, shews no signs of taking any drug, and is ready for a game of football at a minute's notice. The amount of bromide required varies nearly as much as the manifestation of the disease, but by no means in the same way for apparently mild types of the disease need large doses, whereas in some cases severe types are arrested by small doses. The case of A. M. in the tables illustrates this. He is a big boy and came under treatment at the age of 15; his fits then numbered on average over 200 a year. In 1904 at the colony without treatment in seven months he had 235 fits; for the remaining five months of the year on very small doses he had 42 fits: total for year 277. On 60 grains a day for 1905 only

2 fits in that year, and the following year, 1906, on the same dose no fits were seen.

C A S E A. M.

CASE A. M.

Year.	Jan.		Feb.		March.		April.		May.		June.		July.		August.		Sept.		Oct.		Nov.		Dec.		Total Fits for Year.
	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	
1903	* Gr.		Gr.		Gr.		Gr.		Gr.		Gr.		Gr.		Gr.		Gr.		Gr.		Gr.		Gr.		
1904	—	4	—	31	—	33	—	36	—	47	—	29	—	55	30	9	50	21	50	0	50	10	60	2	277
1905	60	0	60	0	60	0	60	0	60	0	60	0	60	0	60	1	60	0	60	0	60	1	60	0	2
1906	60	0	60	0	60	0	60	0	60	0	60	0	60	0	60	0	60	0	60	0	60	-0	60	-0	0

	Gr.		Gr.		Gr.		Gr.	
1904	-	4	-	31	-	33	-	36
1905	60	0	60	0	60	0	60	0
1906	60	0	60	0	60	0	60	0

Typing of tables not satisfactory. The above is from a reprint of a paper by me which appeared in the BMJ some weeks ago R J McCallum

May		June		July		Aug.		Sept.	
Br.	Fits	Br.	Fits	Br.	Fits	Br.	Fits	Br.	Fits
Gr.		Gr.		Gr.		Gr.		Gr.	
-	47	-	29	-	55	30	9	50	21
60	0	60	0	60	0	60	1	60	0
60	0	60	0	60	0	60	0	60	0

Oct.		Nov.		Dec.		
Br.	Fits	Br.	Fits	Br.	Fits	Total Fits for year
Gr.		Gr.		Gr.		
50	0	50	10	60	2	277
60	0	60	1	60	0	2
60	0	60	0	60	0	0

During 1907 at farm work he shammed fits but has now given over that. To satisfy my committee I used to keep the boys for the first six weeks after

admission without any treatment, and then begin treatment so that they might have trustworthy evidence of the value of bromide, but now the method generally is to begin immediately with ten grains night and morning, and increase by ten grains a day as often as fits occur. My experience has convinced me that childhood and youth stand bromide very much better than adults, and old age. Boys take 80 and 100 grains a day without shewing any sign that they are taking a drug, moreover they do school work and improve their education wonderfully, as shewn by following educational report by Schoolmaster Mr. Colyer:

	Six Months after Admission.	At Present.
R. B.	Reading very poor.	Great improvement; fluent and correct.
	Writing - very poor.	Good progress in writing and spelling.
	Recitation - a few lines.	Can recite a poem 50 lines.
	Arithmetic - very backward.	Has improved; great improvement in mental work.
	Geography - very little.	Knows England's towns, rivers, industries.
	History - very little.	Knows English history.
	Fits - 238 a year.	None during year.
F. S.	Reading - fairly good.	Greatly improved; fluent. Reads Std. IV. book.
	Writing - careful and improving.	Much better; spelling correct, composition good.

F. S. contd.	Recitation - repeat lines.	Recites "The Village Blackismit" very well.
	Arithmetic - good.	Marked progress; manages practice.
	Geography - knows England.	British possessions, chief exports, &c.
	History - something of English history.	Knows chief events from Norman Conquest.
	Fits - 80 a year.	Three during year.

A. M.	Reading - has learned his letters.	Fair improvement; can read Std. 3. took.
	Writing - very bad; can't form words.	Good progress; writes with left hand.
	Arithmetic - no progress.	Simple addition; multiply by one figure.
	Recitation - nil; can't remember lines.	Can recite a few lines.
	Geography - nothing.	Can answer simple questions.
	History - nothing.	Still practically nothing.
	Fits - 267 a year.	None during year.

When the dose reaches 160 grains per day there is in some, a loss of the sense of equilibrium (mainly reflex sense);at 200 grains a day this sense is always interfered with, walking becomes uncertain and it is necessary to keep them in bed, with larger dosesb swallowing is jerky and performed with effort, there is loss of control of the organic reflexes.

Twelve years ago I had a desperate case, - a boy aged four who had fits very frequently and severe, varied from 7 to 15 a day. The parents were distracted and allowed me a free hand. Bromide was given liberally, 60 g rains the first day, and as fits went

on the dose was rapidly increased and reached 320 grains on the sixth day, on the seventh day there were no fits and as the boy looked like dying the bromide was stopped and albumen water with brandy freely given. There was a fit the following day, and bromide was given again, 120 grains a day - no fits; next day 100 grains - no fits; then down to 80 the following day; then 60 grains per day for a week with no fits; with 30 and 20 grains a day for the rest of the year of about that, as the parents got careless and soon stopped treatment. The boy remained without treatment and without fits for three and a half years. More fits then returned and again the boy was treated for five months. As fits stopped the treatment was again left off and there were no fits for eighteen months. After this the treatment was most eratic and unsatisfactory. At present he is taking 5 or 6 fits a year on about 60 grains a day. While he was taking the large doses of bromide he lay on his back apparently powerless, but displayed plenty of energy when a f it came on. The fits got less severe and less frequent as the dose went up. He had sordes on his lips and gums, breath was very foul, swallowing very difficult, slight hoematemises, moderate melaena, respiration was very shallow and halting, the lung

bases were congested and rales were heard. I watched the heart carefully but did not see the dreaded toxic action of potassium salts. The pulse was regular throughout the treatment, the apex-beat was not altered, the sounds lost in intensito and clearness, but they were never lost or even greatly enfeebled. It was the breathing that indicated the greatest danger and threatened life. Dr. Clouston in his experiments already referred to, also found this to be the case. The toxic action of potassium on the heart is in my experience a myth. I have looked ~~in vain~~ for it for many years yet I have not found it, although I have had plenty of opportunity, seeing that for migraine, gravel and some eczemas I have given citrate of potash in from 60 to 90 grains per day for long periods. The patients, often old, have never complained of any symptom of cardiac weakness, nor have I found any. Martindale, in the last edition of his extra-pharmacopea, quotes Dixon - "Potassium salts administrated per OS are non-toxic; they are eliminated faster than they are absorbed."

The manner in which fits disappear under bromide is like the disease - varied. Sometimes they disappear suddenly and completely, at other times they gradually fall off in severity and

frequency, while again the bromide seems greatly to lengthen the interval, and then a group of much more severe fits than usual attacks the patient for a a day or two, when they leave for a still longer interval. Usually "grand-mal" gives way to "petit-mal," and "petit-mal" to lapses of memory or fits of temper, and finally these also disappear.

Other Drugs. Having found in bromide all that I want I have tried no other except those necessary in exceptional cases - as worms, constipation and toxins.

Objections to Bromide. Its lowering action, its toxic effect on the heart and the rash: I do not think that the first two exist when fits are manifest. The lethargic state, the sullen temper, and the outbursts of furious passion that are sometimes seen under bromide are due more likely to the unsubdued disease than to the action of bromide, for they disappear on a further exhibition of the drug. With the rash I have little trouble. Always using the best made English bromide may account for this, and it is less likely to be troublesome with large doses than with small ones. Out of 58 cases under treatment at present only seven shew rash. In five it is only in the form of a few papules on the forehead, in one

it is a superficial dermititis, in the other it is a purpuric looking ulceration of both legs in the front ind over their middle third. Two years ago this boy had the same trouble, it then went away without the bromide, being knocked off and without any special treatment beyond a soothing antiseptic cream. Three months ago it again returned and was troublesome - arsenic, mercury, iodide, calcium, chloride and iodide, and sarsae were used without any effect. The ulcers are now healing as they did before without any special treatment.

Various Bromides. I am aware that a mixture of the bromides is a favourite prescription for treatment, but as the reason for this is to avoid a danger (toxic action of potassium on the heart) that I do not believe exists I have never used the mixed salts. The potassium salt alone gives me satisfaction: it is more stable, more easily obtained pure, and the price being much less than the others places it within reach of the poorest.

Surgical Treatment has not come up to its good promises. To be beneficial it must be resorted to very early and in carefully selected cases, - the raising of a depressed fracture, removal of a sequestrum, relief of an adhesion between membrane and brain,

removal of a cerebral tumor where such can be done without producing a scar on the brain. Operative means should also be used as promptly as possible to remove the cause of the epilepsy, when this is situated outside the brain in peripheral parts of the body - adenoids, nasal polypi, hernia, undescended testis, floating kidney, renal calcuti, adherent prepuce, ovarian and uterine conditions and foreign bodies wherever they are. As the fits often continue after the cause has been removed, especially where they are of long standing, it is very necessary to treat the disease for months and watch the case for years. It is difficult to get statistics of the results of operation. Spratling gives the history of 36 cases in his book, and it is melancholy reading. A selection of more unlikely cases could scarcely have been made. Small wonder that only one was cured. It was the only one that shewed any promise of a beneficial result. Turner is cautious about the benefit of operation, but seems to favour the discarded excision of the cervicial ganglia. This operation was undertaken to cause permanent flushing of the brain with blood supply, as it was supposed epilepsy had its origin in cerebral anaemia.

Dietetic Treatment has been even more disappointing

than surgical. All that has been ever claimed for it is that it helps to lessen the number and severity of the attacks in some cases. Nitrogenous food was struck off as it was considered the principle source of nerve energy, and epilepsy was due to excess of this energy. Hughlings Jackson advocated this, and it was put to the test by Merson. He put a given number of epileptics on to nitrogenous diet. The result was not conclusive but there was a very slight influence in favour of the latter diet: the attacks seemed rather less severe and rather less frequent - meagre testimony indeed. Salt free diet was also founded on a false foundation, e.g. that the benefit conferred by bromide was due to its replacing chloride in the tissues. It has been tried and there is no evidence in its favour.

For that group of cases that have their origin or their exciting cause in toxic products and constipation, I believe diet is very important and for the senile epileptic a purin free diet may be of value, but for the ordinary run of cases the guiding principle of dietry might be well summed up in everything fresh, everything limited, flesh not oftener than once a day anh three times a week is ample.

RESULTS. Sixty-six cases have been treated at

the school colony, and although it is too soon to speak of cures I am of opinion that six bad cases have had their epilepsy arrested, four of these have had no fit for over two years, one is maintaining himself and has had no fits for three and a half years, and five remain with us working on the farm colony. Three cases have been removed from the school colony by their parents much against our wish, two of them have been free from fits for two and a half years and are working, but the other one, I am sorry to say, has again got bad epilepsy. He was removed by his father after only eighteen months' treatment. As he had been freefrom fits for eight months his father took him home to work. Three cases have been discharged as imbeciles, and one for assaulting other boys anh the schoolmaster. One was removed by parents, as they did not approve of the treatment. Of the other cases at the school colonynow it is much too soon to report, but a large number are promising very well. We are getting valuable experience. I feel that we do not get our cases early enough, and that if we could only secure this, a very large percentage of arrested cases and even cured cases would be shewn. A few more years of Starnthwaite experience will shew whether epilepsy can be permanently arrested or not;

it has shewn already that the boys can have their disease temporarily arrested, and that they can be educated while their treatment is proceeding. This I consider a sufficient reason for the state establishing school colonies all over the country for the education and early treatment of the young who are otherwise healthy and suffer only from this disease.

CASES SHEWING BROMIDE
Dose and Effect.

CASE H. V.

Year.	Jan.		Feb.		March.		April.		May.		June.		July.		August.		Sept.		Oct.		Nov.		Dec.		Total Fits for Year.
	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	
1904	—	—	—	—	—	—	—	—	—	44	—	24	Gr. 20	44	Gr. 20	18	Gr. 20	8	Gr. 40	1	Gr. 40	0	Gr 50	1	133
1905	50	0	60	1	60	0	60	1	60	0	70	1	80	0	80	0	70	0	60	0	60	0	60	0	3
1906	60	0	60	1	60	0	60	0	60	0	70	2	70	0	70	0	70	0	70	0	—	—	—	—	3

C... B. B.

This case is one of the ordinary cases received at the colony. It shews that bromide in small doses is no good, but in full doses is most valuable in arresting fits: and for proof that it does good otherwise se the report on his educational advance given by the master last year, and copied in this thesis at page 36. He was a dull sleepy treacherous boy without bromide, with it he is bright and happy.

CASE B. B.

Year.	Jan.		Feb.		March.		April.		May.		June.		July.		August.		Sept.		Oct.		Nov.		Dec.		Total Fits for Year.
	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br	Fits.	Br.	Fits.	Br	Fits.	Br.	Fits.	
1904	—	—	—	—	—	—	—	—	—	—	—	18	—	71	20	15	40	8	50	3	60	1	60	3	119
1905	70	0	70	0	70	0	70	0	70	0	70	0	70	0	70	0	60	0	50	0	50	0	50		0
1906	40	0	40	0	40	0	40	0	40	0	40	0	40	0	40	0	40	0	40	0	—	—	—	—	0

Case B. B., one of the smartest at the colony. He was at farm work in 1907, and did well, but had a difference with his master and ran away.

Case F. B. - just the same as above - also went to farm service in November 1906 and did very well. As the farmer refused to give him more pay he also ran away and after roughing it for a month obtained of his own asking another similar post and is doing better than before and still free from fits.

CASE E. T.

Year.	Jan.		Feb.		March.		April.		May.		June.		July.		August.		Sept.		Oct.		Nov.		Dec.		Total Fits for Year.
	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	Br.	Fits.	
1903	—	—	—	—	—	—	—	—	—	—	—	2	—	5	—	4	—	4	—	1	—	0	—	0	16
1904	—	0	—	4	—	5	—	4	—	5	—	4	—	19	—	5	—	0	—	4	—	17	—	5	72
1905	—	2	—	13	—	3	—	5	—	10	—	9	—	6	—	5	—	10	—	10	—	10	—	16	99
1906	—	14	—	9	20	3	40	0	40	0	40	0	40	0	40	0	40	1	40	0	40	0	40	0	Since Br started 4
1907	40	0	40	0	40	0	40	0	40	0	40	0	40	0	40	0	30	0	30	0	30	0	20	0	0

Case E. T. is unusual. He was treated with doses from 40 to 60 grains a day during 1903 and 1904. There was a change of matron at the colony at the time and the bromide report for that period was lost. He looked so absolutely dazed and stupid that I stopped the bromide in 1904, and it was not resumed until 1906 - no bromide in 1905 with increase of fits and much more pronounced stupor. In early 1906 bromide was resumed and the boy's spirits and capabilities jumped up immediately, and his fits jumped down to vanishing point as shewn by table:

Year	Jan Bromide	Jan Fits	Feb Bromide	Feb Fits	Mar Bromide	Mar Fits	Apr Bromide	Apr Fits	May Bromide	May Fits	June Bromide	June Fits	July Bromide	July Fits	Aug Bromide	Aug Fits	Sept Bromide	Sept Fits	Oct Bromide	Oct Fits	Nov Bromide	Nov Fits	Dec Bromide	Dec Fits	Total fits for Year
	Admitted								No		1906		Average				No		Fits		1907				108
1906																									
1907	80	3	80	4	80	2	80	3	80	3	100	5	100	4	100	1	100	0	120	4	120	0	120	4	33
1908	140	1	140	0	180	1	180																		

Case H. B. Not under treatment long and has very severe fits. The doses here are larger than in the others shewn, but not exceptional. On them he is working in the fields and equal for football, cricket or a fight at a minute's notice, and shews no sign of being drugged.

Year	Jan Br	Jan Fits	Feb Br	Feb Fits	Mar Br	Mar Fits	Apr Br	Apr Fits	May Br	May Fits	June Br	June Fits	July Br	July Fits	Aug Br	Aug Fits	Sept Br	Sept Fits	Oct Br	Oct Fits	Nov Br	Nov Fits	Dec Br	Dec Fits	Yearly Total No Fits
1904					—	7	—	7	—	10	—	7	30	8	40	8	40	0	40	3	60	7	60	3	= 60
1905	60	3	70	0	70	0	70	0	70	0	70	0	70	0	70	0	60	0	50	2	60	0	60	0	= 5
1906	60	0	60	1	60	1	60	0	60	0	70	7	70	0	70	1	80	0	80	0	80	0	80	1	= 10
1907	80	0	80	0	70	0	60	0	60	2	60	0	60	3	80	2	80	0	80	2	100	0	100	0	9
1908	120	0	120	0	120	0	120	0	to date	27/4/08															

Case F. S. In this case a continuous effort has been made to keep on low dose for no particular reason except to gratify the wish of the matron who is allowed a fairly free hand, as I can only visit the colony about twice a month. As evidence that bromide does no harm to intellect I make a few extracts from the schoolmaster's report for 1907:

READING. Can read any book in very creditable manner.

RECITATION. Rendeqs lines very carefully and with expression.

WRITING. Clean, bold, upright writingb spelling good; composition correct.

NUMBERS. Good progress, quick to ans wer mental questions.

DRAWING. Very good; freehand improved; free-arm and brushwork good.

DISCIPLINE: obedient. RESPONSE: good. MEMORY: usually good.

MENTAL ACTIVITY. Intermittent as on admission.

WILL POWER. Shews self-control and fair amount of energy.

PHYSIQUE. Grown, filled out, a well-developed lad.

HEALTH. Good.

MORAL PROPENSITIES. Good improvement - used to steal.

EPILEPSY. Good improvement maintained. No fits this year to date, April 18, 1907. Transferred to farm. On admission a very severe case.

	Jan		Feb		Mar		April		May		June		July		Aug		Sept		Oct		Nov		Dec		Years Totals
	Br	Fits	Br	Fits	Br	Fits	Br	Fits	Br	Fits	Br	Fits	Br	Fits	Br	Fits	Br	Fits	Br	Fits	Br	Fits	Br	Fits	
05					average		no		stated		over		20		a		month						16		260
06	20 30	11	40 50	3	60	6	60	0	70 80	7	80	2	80	5	80	2	80	0	80	0	80	2	80	5	43
07	80	1	80	0	70	0	70	0	70	0	70	0	60	0	60	0	50	0	50	0	50	0	50	0	1
08	50	0	50	0	50	0	50	0													to	date			0

Case J. H. Another case of severe epilepsy of the usual kind received, with the usual good result of treatment shewn. He has had no fits for fifteen months: I wish to point out that the reduction of dose in this case has been much better done. Here again I wish to quote the schoolmaster.

Epilepsy (on admission)"A severe type: starts without any warning, shouting, screaming, plunging madly forward, using horrible language - then fit. When coming round bites and snaps at everything."

READING. Made progress; reads qui etly.

WRITING. Good progress; spells correctly.

NUMBERS. Puts them down now. Unknown on admission.

GEOGRAPHY. Appears interested. Can draw map of England.

DRAWING. Not much improvement. On slate very well.

COLOURING. Brush work shews improvement.

DISCIPLINE. Fairly obedient.

RESPONSE. Has opened out somewhat (on admission none).

MEMORY. Dull with bright intervals.

WILL POWER. No self control over his passions; still bites himself and swears when upset.

PHYSIQUE. Slight build. Has grown; not robust. Grown 2 inches, gained 4 lbs.

RECREATION. Fond of play. Too excitable for cricket match.

HEALTH. Fairly good.

MORAL PROPENSITIES. Bad language chief vice.

EPILEPSY. Good improvement maintained.

I have many other examples of cases like these, but it would serve no useful purpose to multiply them. I think I have submitted enough and more

than enough to prove that the evils attributed to the administration of bromide in large dose to the young epileptic are a delusion

Table I showing 1st teething age is not delayed in epilepsy and 2nd delayed dentition does not correspond with infantile convulsion and 3rd large percentage of infantile convulsions found in epilepsy

Case name	Teethers Age	Teething Fits	Age Epilepsy first manifest	Heredity	Stated Cause
Jones	18 months	Yes	9½ years	Yes	——
Haygarth	9 "	no	8 years	none	——
Woodcock	6 "	no	10 years	none	Fright
Hawkhead	11 "	Yes	1 Year	none	——
Lawrence	12 "	no	5 years	none	——
Heaton	9 "	no	12 years	Yes (brain tumor)	——
Houghton	7 "	Yes	8 years	none	Shock to mother
Nicholson	8 "	Yes	9½ years	none	Blow
Harrison	18 "	no	10½ yrs	none	Fall
Hopkins	13 "	Yes	4 years	Yes (mothers sister)	Falls
Shaw	12 "	Yes	9 years	none	——
Hirst	4 "	no	5 years	Yes (fathers cousin)	Fall
Grubb	10 "	Yes	5 years	none	——
Filling	6 "	Yes	8 years	none	——
Howard	7 "	no	8½ years	none	Fall

Case name	Teething Age	Teething Fits	Epilepsy Age 1st manifest	Heredity	Stated Cause
Robinson	11 months	Yes	2 years	none	
Tompson	6 "	no	9 "	none	Fall
Seaton	10 "	no	7 "	none	
Barker	12 "	Yes	9 "	none	
Christopher	9 "	no	4 "	none	Accident
Towlin	8 "	Yes	1 4/12 "	none	
Leech	3 "	no	12 "	none	Accident
Barker	8 "	no	5 "	none	Fall
Wade	12 "	Yes	1 "	Yes - frequent eclampsia	
Birley	5 "	no	12 "	none	
Giess	7 "	Yes	1 "	Yes well marked	
Stewart	3 "	Yes	3 months	Yes Uncle	Teething
Barrow	7 "	Yes	Birth	none	Teething
Wilkenson	10 "	no	10 yr	none	Fall
Clark	7 "	no	16 "	none	Fall
Savage	7 "	Yes	1 "	none	
Shepherd	7 "	no	14 "	none	Fright
Smith	7 "	no	5 "	none	Excitement
Dalwood	6 "	Yes	2 "	none	Teething
Brooks	13 "	no	6 "	none	Fall

35 cases of epilepsy shewing the teething age to average 8·9 months. Infantile convulsion to be present in 45·7% and heredity to stand at 20% not too low as I know most of the families

Table II to shew Heredity. Age of onset, aura and stated cause

	Case	onset	Heredity	Cause stated	Aura
1	H.C.	4th year	none	—	Yes
2	J.B.	Birth	none	—	Yes
3	R.B.	Unknown	Yes = mother fam	—	Yes
4	G.W.	9th year	Yes - 7 asylum	—	no
5	A.Y.	Birth	Yes mother fel	—	no
6	A.M.	1st year	none	Teething	Yes
7	H.V.	9	none	—	no
8	J.O.	11	none	—	no
9	H W	10	none	Fright	no
10	J.S.	8	none	Accident	no
11	W.T.	—	none	Fall	no
12	H.L.	12	none	Fall	no
13	J.W.	11	none	Fright	no
14	W W	1st	none	Accident	Yes
15	H.T.	2nd	none	—	no
16	R.T.	1st	none	—	no
17	J K	1st	none	—	no
18	H T	11th	none	—	Yes
19	E A	—	none	—	no
20	J H.	2nd	none	—	Yes
21	B.S.	1st	none	—	no
22	H.B.	12	none	Fall	no

Case	Onset	Heredity	Stated Cause	Aura
23 a S	3rd yr	none	—	Yes
24 M H	3	none	—	—
25 C B	6	none	Fall	Yes
26 S B	3	Yes. father lead fits	Teething	Yes
27 H P	8	Yes. mother suicide	Fall	Yes
28 R H	8	none	—	Yes
29 C T	1st	none	—	—
30 W T	7	none	Fright	Yes
31 J H	5	none	—	
32 J A	6	none	Fall	Yes
33 A B	5	none	—	—
34 E W	6	none	—	—
35 G G	4	none	Head injury	—
36 L T	3	none	—	Yes
37 L B	2	none	Head injury	Yes
38 W. C	2	Yes father alcohol fits	Fall	Yes
39 J. J.	12	none	—	—
40 J G	1st	Yes	—	—
41 a S	1st	Yes	Teething	—
42 a B	1st	none	Birth Palsy	Yes
43 a W	11	none	Fall	—
44 H C	15	none	Fall	—
45 T P	45	none	—	—
46 R D	10	Yes	—	—
47 M W	28	none	Child Bearing	Yes

Case	onset	Heredity	Stated Cause	Aura
48 MT	28	none	Pregnancy	Yes
49 MS	12	none	—	—
50 EH	22	none	Kidney Pain	—
51 AS	1st	none	Birth Palsy	—
52 AS	1st	none	Teething	—
53 MK	4	none	Fall	—
54 MR	16	none	—	—
55 JS	4	none	excitement	—
56 EJ	8	Yes	Fall	—
57 JA	18	none	—	Yes
58 JO	48	none	—	—
59 MS	14	none	Fright	Yes
60 HO	1st	No	Teething	—
61 BJ	3rd	Yes	—	—
62 JH	1	Yes (Father Brain Tumor)	—	
63 JR	2	none	—	
64 EH	4	none	—	Yes
65 RW	1	none	—	
66 EM	6	none	—	Yes
67 EW	1	none	—	Yes
68 JS	1	none	—	Yes
69 JB	5	none	Meningitis	Yes
70 HL	5	none	—	—
71 WK	—	none	—	—
72 CH	8 1/2	none	—	—

Case	Onset	Heredity	Stated Cause	Aura
73 J B	8½	Yes mother epileptic	Scarlet fever & nephritis	Yes
74 S S	5th	none	—	Yes
75 H S	7th	none	—	No
76 F S	9th	none	Teething	No
77 J H	9½	none	—	Yes
78 J.H.	5th	none	—	Yes
79 R H	10½	Yes: father dwarf	Fall	Yes
80 L H	6½	none	—	Yes
81 E H	1st	none	—	No
82 A W	5	none	Fright	Yes
83 A B	2	none	—	No
84 G H	4	none	—	Yes
85 E D	8	Yes mother epileptic	—	No
86 F W	11½	none	—	Yes
87 H B	1st	none	Falls	No

The most important thing about this table is that it shews the hereditary influence of epilepsy present only in 17.1% although this includes a case where "mother faints" and "father has drinking fits" "father had lead poisoning" "father tumor of brain" and "father like a dwarf" Two cases were returned giving history of "tumor of brain but one was found to be a "worm"; no

information could be got about the other. The "mother a suicide" needs a word of explanation. The family history is very good otherwise and the father of the boy asserts with considerable show of reason that it was the epileptic boy that drove the mother to this deed. The boy gave her no rest constantly at her, swearing at her, kicking and biteing her and having her to nurse him night & day until she broke down under the strain. My 17% is as high as I can get and not as low as I might just it. The frequency with which "falls" appears as a cause is misleading. I place no importance on this cause unless I know the circumstances of the fall well & the previous history of the case. The fall is nearly always due to the epilepsy, unless there is a clear history of an accident causing the fall this is certainly so. All the other causes given are likely correct and sufficient without the predisposition & stigmata of degeneration being added. I have so often seen only one member of a large and well

balanced family have epilepsy in a very pronounced degree and that member so completely free from the stigmata of degeneration that I cannot accept it as evidence of any moment in the production of epilepsy. The stated cause in my last of 87 cases works out Falls 13, teething 6, fright 5, accidents 4, birth palsies 2, pregnancies 2, excitement 1, fever 1, other diseases 2. The aura was present in 40·2 per cent. Its importance has I think been much over stated. It is of use in diagnosis and in the localization of the so called organic epilepsy

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